

AMENDMENTS TO THE CLAIMS

The following is a complete, marked-up listing of revised claims with a status identifier in parenthesis, underlined text indicating insertions, and strike through and/or double-bracketed text indicating deletions.

LISTING OF CLAIMS

1. (Original) An image sensor, comprising:

a plurality of row lines;

a plurality of column lines crossing the plurality of row lines;

a plurality of pixels, each pixel formed at a respective crossing of one of the plurality of row lines with one of the plurality of column lines, each pixel generating a charge based on light incident thereon and selectively transferring the charge to the respective column line based on a signal received from the respective row line; and

a plurality of column driver circuits, each column driver circuit associated with one of the column lines and configured to generate an output voltage based on the charge on the associated column line.

2. (Original) The image sensor of claim 1, wherein each pixel comprises:

a photoelectric transformation element converting incident light into a charge; and

a transfer circuit configured to transfer the charge to the respective column line based on a signal received from the respective row line.

3. (Original) The image sensor of claim 2, wherein the photoelectric transformation element includes a photo diode.

4. (Original) The image sensor of claim 2, wherein the transfer circuit is a transistor connected between the photoelectric transformation element and the respective column line and having a gate connected to the respective row line.

5. (Original) The image sensor of claim 4, wherein the transistor is a depletion mode NMOS transistor.

6. (Original) The image sensor of claim 1, wherein each column driver circuit comprises:
a driver circuit configured to generate a voltage based on the charge on the respective column line; and
an active load connected between an output of the driver circuit and ground.

7. (Original) The image sensor of claim 6, wherein the driver circuit includes a drive transistor having a first electrode, second electrode and a gate, the first electrode being connected to a supply voltage, the second electrode serving as an output of the column driver circuit and connected to the active load, and the gate controlling operation of the drive transistor based on the charge on the associated column line.

8. (Original) The image sensor of claim 7, wherein the active load includes a load transistor connected between the drive transistor and ground.

9. (Currently Amended) The image ~~[[senor]]~~sensor of claim 6, wherein each of the column driver circuits further comprises:

a reset circuit configured to selectively reset the charge of each pixel associated with the associated column line.

10. (Currently Amended) The image sensor of claim 6, wherein the driver circuit generates a reference voltage when ~~[[the]]~~a reset circuit resets the charge of each pixel associated with the associated column line.

11. (Original) The image sensor of claim 9, wherein the reset circuit includes a transistor connected between a supply voltage and the associated column line.

12. (Original) The image sensor of claim 11, wherein the transistor is a depletion mode NMOS transistor.

13. (Original) The image sensor of claim 6, wherein the column driver circuit further comprises:

a start circuit configured to selectively output the generated voltage as an output of the column driver circuit.

14. (Original) The image sensor of claim 13, wherein
the driver circuit includes a drive transistor having a first electrode, second electrode and a gate, the first electrode being connected to a supply voltage, the second electrode connected to

the start circuit, and the gate controlling operation of the drive transistor based on the charge on the associated column line;

the start circuit includes a start transistor connected between the drive transistor and the active load with output of the start transistor to the active load serving as output of the column driver circuit; and

the active load includes a load transistor connected between the start transistor and ground.

15. (Original) The image sensor of claim 14, wherein
the drive transistor is an enhancement mode transistor;
the load transistor is an enhancement mode transistor; and
the start transistor is an enhancement mode transistor that is larger than the drive transistor and the load transistor.

16. (Original) The image sensor of claim 1, wherein the column driver circuit is configured to reset the charge of each pixel associated with the associated column line.

17. (Currently Amended) The image sensor of claim 1, wherein one column driver circuit is associated with each of the column lines.

18. (Original) An image sensor, comprising:
a plurality of row lines;
a plurality of column lines crossing the plurality of row lines;

a plurality of pixels, each pixel formed at a respective crossing of one of the plurality of row lines with one of the plurality of column lines, each pixel generating a charge based on light incident thereon and selectively transferring the charge to the respective column line based on a signal received from the respective row line; and

a plurality reset circuits, one reset circuit being associated with each of the column lines and configured to reset the charge of each pixel associated with the associated column line.

19. (Original) The image sensor of claim 18, wherein each reset circuit includes a transistor connected between a supply voltage and the associated column line.

20. (Original) The image sensor of claim 19, wherein the transistor is a depletion mode NMOS transistor.

21. (Currently Amended) An image sensing method, comprising:
selectively applying voltages to column lines of an image sensor based on a signal received from a row line, the voltages based on charges generated by pixels of the image sensor;
and

generating, for each column line, a data voltage as an output voltage based on the applied voltage.

22. (Original) The method of claim 21, prior to the applying step, comprising:
resetting the charge of each pixel.

23. (Original) The method of claim 22, wherein the resetting step simultaneously resets the charge of each pixel.

24. (Original) The method of claim 22, wherein the resetting step includes applying a supply voltage to each column line to reset the charge of each pixel.

25. (Original) The method of claim 22, further comprising:
generating a reference voltage as the output voltage after the resetting step.

26. (Original) The method of claim 25, wherein the generating a reference voltage step generates the reference voltage until the applying step.

27. (Original) The method of claim 22, further comprising:
repeating the resetting, applying and generating steps for each row of pixels in the image sensor.

28. (Original) The method of claim 22, further comprising:
initializing the output voltage.